**Learning Activity One: Light and Sound**

**Description of the Activity:**

This lesson will introduce students to light and sound as forms of energy. It is the first of five lessons on a unit on light and sound. The main objective of this lesson is to introduce students to the concepts of light and sound. Students will explore definitions and examples of light and sound as forms of energy through a webquest exploration. They will crack the surface of the prosperities of light and sound, which will be studied deeper through the other four lessons. The webquest is intended for students to explore light and sound as forms of energy, to create their own definitions of light and sound, and to compare light and sound energies. The webquest will challenge students to explore internet websites where they will read or watch videos about light and sound, and to watch video examples of light and sound as energy. Students may also come across simple activities to describe what light and sound are. Students will take an opened journey on the webquest to discover their own definitions of light and sound. Students will record their observations and notes, and then present their findings as a group to the class. Each group will add to the classroom’s working definition of these terms. Students will also pose questions they have about light and sound to study in further lessons. If students come across experiments or activities on the webquest, they can present them, or share the idea for further use latter on in other lessons.

The lesson will begin with the teacher engaging students into the world of light and sound. The teacher will engage students by leading the class through two simple light and sound activities that demonstrate light and sound as energy. For the sound activity, the teacher will ask students to put their index and middle finger to their necks. Teacher will have students say the word "Aah" as loud as they can. Then try it as soft as they can. Students will hear a sound and also feel a movement inside their throat. The teacher will explain that when you say, "Aah", your vocal cords vibrate. That means they move quickly back and forth. As vocal cords vibrate they produce sounds. This will lead students to the discovery of vibrations creating different sounds. For the light activity, the teacher will have a glass half filled with water and a straw. The Teacher will have students observe as the straw dips water in and out of the glass. This will lead students to the understanding of how light bends and show students that light travels.

After the students are engaged from the introduction activities, the teacher will divide the students into groups of 3 to 4 students in each group. The teacher will pose a question to students that they will explore through their work on the webquest. The exploration question will be: “What information can you gather about light and sound that will add to the class definition of these terms?” Furthermore, students will be asked to collect information from reading sources found from internet sites. As students navigate through website destinations as presented in the webquest, demonstrative activities that require little or no additional materials may pop up, students will be encouraged to take note of these activities, recording them and possibly attempt them if possible in the classroom. Students will present their findings and any possible activities to the class to add to the classroom definition of light and sound as energy.

Students will begin their webquest search. Once they have complied their information and definition of light and sound, they have completed the webquest. Once students organize their findings into a written definition they will present it to class. Once they presented their findings to the class, they have completed the activity. The lesson will conclude with a classroom discussion where the teacher and students will discuss light and sound as forms of energy and present the working class definition of it. Students will then be required as homework to share their thoughts and ideas about the lesson on the classroom science blog. Students will be expected to complete these reflections as homework. Students who can’t access the blog at home will write their reflections in a science journal, then they will have classroom time to type them into the blog. There will be one reflective question for our classroom science blog for this lesson. They are: “Which activity or experiment did you find on your webquest that you were not able to do, would you most be interested in trying in class? Which materials were you missing that you would need?”

For this lesson students will be working in groups of 3 to 4 students. Each group will have one computer with internet for their webquest. Each group will be working on classroom computers in their classroom and not a computer lab or science lab. Students will have access to project videos they may want to share with the class using the classroom projector. Students will also need to be able to type their reflection question into our classroom science blog.

For this lesson, students will already need to know how to use basic functions of a computer such as turning it on and how to access the internet. Students will also need to already know how to navigate the internet at a basic level with teacher guidance and support. The teacher will support students using the computers by walking around to each group to ensure they have success using the webquest. For using the classroom science blog, students will already need to know how to access and submit information to the science blog. This will be introduced earlier in the year during a class lesson on using the blog. This will not be the students first time accessing the science blog. Students will also need basic keyboarding skills for typing their reflections into the blog.

**Learning Objective:**

Learner Population: This lesson is intended for 3rd to 4th grade students. It will take place over two, one hour science class sessions.

I will be teaching this lesson to a classroom of multi-aged mixed ability students made up of third and fourth graders. I will teach a population of 43 students this lesson. However, I will work with 2 groups of about 20 students at one time. I will teach one group of students this lesson for two class sessions, then the other group of 20 students the lesson on two separate days.

Standards and benchmarks addressed: For this lesson I am addressing numerous state of Michigan Grade Level Content Expectations for third grade science. Please see the “connection to standards section” for specific standards addressed.

Goals and Objectives: At the end of this lesson students will…

* Identify light and sound as forms of energy
* Define light
* Define sound
* Recognize that light is composed of different colors
* Recognize that sounds have different pitches and volumes

**Technology Integration:**

The use of the webquest is critical and crucial to the successful completion of the benchmarks and goals of this lesson. Exploring content and video media on the internet allows for students to get a wide range of content to construct their understandings. Usually, teachers may show one video to the class about light and sound, or may have one text book for students to read about light and sound. The webquest allows students the opportunity to discover and find a wide range of media content such as videos and written text with pictures that students can find and discover on their own, which allows for students to have choice in what they read and watch. This choice in their learning can lead to students taking ownership and increased engagement in their learning. Choice for the students also allows for students to choose content that is at their appropriate level in terms of reading and computer skill abilities. When selecting a text book for students to read, there are often times only the one text for students to read and little differentiation for student reading levels. The webquest allows for a variety of learners to access content and text at their appropriate level. Overall, the webquest can allow for differentiation of content and media that reading a class text book will not usually allow.

The webquest fits nicely into the inquiry method that I have chosen for this lesson. Student exploration time is simply done at the computer on the webquest. The teacher will still conference with each group during exploration time as normal, but this time they will meet with groups at the computers, rather than their science tables. The major change for the teacher will be being able to create the webquest during the planning stages of this lesson. The teacher must select websites and media content for the students that is appropriate for their learning and appropriate for the content of the lesson. The creation of the webquest will be in place of creating an experiment for students to explore and work on.

**Connection to Standards:**

* State of Michigan Standards and Benchmarks: 3rd Grade Science

***K-7 Standard S.IP:*** *Develop an understanding that scientific inquiry and reasoning involves observing, questioning, investigating, recording, and developing solutions to problems.*

**S.IP.E.1 Inquiry involves generating questions, conducting investigations, and developing solutions to problems through reasoning and observation.**

***K-7 Standard S.IA:*** *Develop an understanding that scientific inquiry and investigations require analysis and communication of findings, using appropriate technology.*

**S.IA.E.1 Inquiry includes an analysis and presentation of findings**

**that lead to future questions, research, and investigations. S.IA.03.12** Share ideas about science through purposeful conversation incollaborative groups.

**Energy**

***K-7 Standard P.EN:*** *Develop an understanding that there are many forms of energy (such as heat, light, sound, and electrical) and that energy is transferable by convection, conduction, or*

*radiation. Understand energy can be in motion, called kinetic; or it can be stored, called potential. Develop an understanding that as temperature increases, more energy is added to a system. Understand nuclear reactions in the sun produce light and heat for the Earth.*

**P.EN.E.1 Forms of Energy- Heat, electricity, light, and sound are forms of energy.**

**P.EN.03.11** Identify light and sound as forms of energy.

**Student Prior Knowledge:**

Prior to this lesson, students will be pre-assessed on light and sound through a light and sound pre-assessment. Students will not need to know definitions or examples of light and sound as forms of energy for this lesson. Students need only know that light and sound exist in our world in order to be successful for this introductory lesson. Students should have basic computer skills to use the webquest and computers with the internet. Students will already be working with the classroom science blog prior to this lesson. Students will be supported in this lesson by the teacher guiding their thinking, if needed, during the exploration and classroom discussion time. Students will be supported in this lesson with using technology. The teacher in the classroom will support students with troubleshooting during their exploration with the webquest. For use of the classroom blog, students who are unable to access the internet or blog at home, we have ample time outside of our science block of time to reflect and complete in the classroom. Also, students who are unable to type or successfully complete the blog on the computer may handwrite the blog into a journal. The teacher may then type their reflections into the blog to share with the classroom community.

**Content Knowledge:** Light and Sound

For this lesson, teachers will need knowledge on light and sound as forms of energy. Teacher content knowledge for this lesson includes identifying light and sound as forms of energy, defining light in a formal and scientific way, defining sound in a formal and scientific way, recognizing that light is composed of different colors and recognizing that sounds have different pitches and volumes. Teachers should know the different colors in the light spectrum to assist students as needed. Teachers should be able to define pitch and volume.

For the content being explored on the webquest, teachers should read over and know all content being offered to students. Teachers should read and review all of the possible activities or experiments that students may encounter in their webquest. Teachers possessing the required content knowledge will have success in selecting appropriate websites, video, and media content needed for the webquest.

I personally possess all content knowledge necessary to lead this lesson with students. My content knowledge has been obtained through the study of science units of light and sound in college, studying benchmarks and content expectations, reading science text books on light and sound, and through experiences teaching light and sound concepts in the past.

**Pedagogical Knowledge:** Inquiry method to teaching science

This lesson will use an adapted form of the inquiry method for teaching science following a “Five E” model of inquiry teaching. Students will be guided to explore and construct new learning through a guided exploration. The method of inquiry for this lesson will follow this format:

Engage: Students will be engaged in the concepts of light and sound through the two demonstration activities described in the “activity description” section.

Exploration: Students will explore concepts of light and sound through use of the webquest and a guiding exploration question. The exploration question is, “What information can you gather about light and sound that will add to the class definition of these terms?”

Explain: After the webquest exploration, the teacher will lead students through a classroom discussion on their findings. This is where students will share and present their definitions and findings and where the class will construct their working understandings and definitions of the content of this lesson.

Extend and Apply: This part of the pedagogy of this lesson is where students will apply what they learned to their reflections on the classroom blog. Students will submit their reflections and applications to the blog for further study and review.

Evaluate: Evaluate of student learning comes from their completions of the webquest, classroom blog, and their successful presentations. The webquest will have a rubric to follow for the completion of the presentation aspect of the lesson. Students will be evaluated on the successfulness of the presentation on answering the exploration question. If students contribute a reasonable definition with support and examples, then they have completed the objectives of the lesson.

**Technology Knowledge:** Webquest and classroom blog

Teachers will need to create a webquest or find an appropriate webquest to fit this lesson in order to successfully execute this lesson. Teachers will need to know how to set up and successfully run a classroom blog for this lesson to be successful. In order to create a webquest that is appropriate for the needs of this lesson, teachers will need to create a webquest on [www.zunal.com](http://www.zunal.com). There is also an example of a light and sound webquest at zunal.com to help guide teachers with resources needed. When creating the webquest, teachers will need to be able to successfully navigate the internet to select the websites and video content needed for the lesson. Teachers also need knowledge of how to set up and run a classroom blog. The classroom blog used for my classroom blog is found on the website: <http://edublogs.org>. Teachers will also need to be able to troubleshoot basic computer and internet functions during the lesson. The basic troubleshooting teachers will do includes; turning on and off computers, managing website troubles, and basic typing support.

I personally have all technology knowledge needed for success in this lesson. I gained this knowledge through my work on my master’s degree program and my experiences teaching with blogs and webquests in the past.

**TPACK Analysis:**

This lesson involves students learning the content of light and sound while using the method of inquiry based teaching with using webquests and blogs. The webquest fits extremely well into the exploration section of the inquiry method of teaching. Students are exploring concepts of light and sound through the use of a webquest, which is very similar to how the exploration section of the inquiry method is used on a regular basis. Typically, during the exploration section students will conduct an investigative experiment which will led them in constructing knowledge and new learning of the content being covered. The same thing is being done in this lesson with the only difference being that the investigative experiment takes the form of a webquest. The webquest fits in well with the exploration part because an exploration question can be set to allow students to explore and construct new learning through their own exploration. Students will be searching for content and information while being led and supported through the open ended style guidelines of the webquest. I have used webquests in the past with success as part of the exploration section of the inquiry method of teaching.

The internet is full of rich text, media and hands on activities for students to experience the content of light and sound for this lesson. The webquest allows for students to be guided through these experiences found on the internet. The webquest fits very well with the idea of students exploring the internet for text and media and learning the content at their own appropriate pace and level.

The classroom blog is a great reflective tool to use with students and fits nicely in the inquiry method of teaching in the section of extend and apply. The reflective questions allow students to apply and at times extend what they learned to new situations. Having students reflect at home gives students time to process what they learned in class and then apply their newly constructed knowledge in the form of written reflection. The technology enhancement of the blog allows for students to instantly share their ideas to the entire class community. This allows for students to share ideas and share reflections. It allows for students to feel comfortable and safe with the ideas they are sharing because they know that their peers have done the same. As compared to a written journal where students only see what they have written, the blog allows for sharing and new ideas and reflection to come from the group discussion. Also, the blog is a tool that can’t be lost or misplaced or not returned to school. Students who may have forgotten their journal at home would be unable to share their thoughts and ideas with the class the following day. With the blog students could access their thoughts and ideas easily in the classroom through the use of classroom computers or class projector. I know that this use of technology can be successful in this lesson because I have utilized classroom blogs in science class before to great success.

**Assessment Plan:**

Assessment of student learning comes from their completions of the webquest, classroom blog, and their successful presentations. The webquest will have a rubric to follow for the completion of the presentation aspect of the lesson. Students will be evaluated on the successfulness of the presentation on answering the exploration question. If students contribute a reasonable definition with support and examples, then they have completed the objectives of the lesson.